BIOS Special Topics Electives and Project Labs

Spring 2020 BIOS Special Topics Electives

BIOS 4801 History of Neuroscience (Nichols)
Meets: T 3:00 pm-03:50 pm, Location TBA
Prerequisites: Permission of instructor
Description: The purpose of this seminar is to learn and explore the history of neuroscience from a perspective of reading classic papers that have evolved. The history of neuroscience can be traced back to at least the time of Rene Descartes and has a history of seminal papers and readings in behavioral, cellular, physiological, computational and cognitive domains. This class will utilize readings of various classical papers, readings of Nobel lectures and chapters to demonstrate the evolution of the field.

BIOS 4803 Neuromotor Physiology (Balog and Nichols)
Meets: TR 1:30 pm-2:45 pm, Location Fourteenth Street 1253
Prerequisites: APPH/BIOL 3755 Human Physiology or BME 3100 Systems Physiology
Description: This course focuses on the function and adaptations of the skeletal, nervous and muscular systems. Students will gain understanding of the normal physiological responses of these systems and how each adapts to perturbations such as physical and psychological stressors such as loading and pathology. Interactions among the various systems and their plasticity will be emphasized.

BIOS 4803 – Nutrition (Rosbruck)
Meets: Asynchronously online
Prerequisite: APPH 1040/1050
Credit hours: 3
Description: The course is a study of human nutrition as an applied science and covers nutrition physiology: metabolism, energy, production, biochemical aspects, role of nutrients, weight control mechanisms, fitness and consumerism.

BIOS 4813 MGU Biodiversity on a changing planet
Meets: MW 11:15 am-12:05 pm and F 11:15 am-2:00 pm, Cherry Emerson 320 and CULC 483
Prerequisites: BIOS 1510 or EAS 1600 or permission of the instructor
Credit hours: 3
Description: Why do plants and animals live where they do and how will they respond to changing environmental conditions? This course will explore scientific approaches to untangle the dynamic interactions between geologic features, climate, and biodiversity. In it, we will use real data to examine the fundamental principles of landscape ecology and biogeography and their applications to conservation practices. The course will consist of 2 hours of lectures and 3 hours of lab per week. Students will be evaluated on lab write-ups that will integrate concepts from lectures that are then demonstrated through computational labs. In these labs, we will practice the techniques used to map and analyze patterns of biodiversity. Through this course, students will gain marketable GIS skills while simultaneously learning how to formulate spatial hypotheses about ecological processes. At the end of the course, students will develop independent projects, in which they formulate hypotheses about spatial interactions between abiotic and biotic factors and test those hypotheses using real data.
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Spring 2020 Project Labs

BIOS 4590 Research Project Lab (Schmidt-Krey) – Molecular and Structural Biology Research Using Bioinformatics and Computational Biology Approaches
Meets: MW afternoons in Cherry Emerson
Credit hours: 3
Description: Students will gain experience in designing, implementing, and communicating a biology research project, and practical training in modern approaches for biological research. This section will have a scientific theme of Molecular and Structural Biology Research Using Bioinformatics and Computational Biology Approaches. Following initial experiments to obtain hands-on knowledge and training in methods, students will design and carry out a research project, communicating the overall goal and results in an end-of-semester manuscript and poster presentation, as well as in the Communicating Biological Research class.

BIOS 4590 Research Project Lab (Hu and Jiang) – How Fire Ants Cooperate
Meets: TR afternoons in Boggs 1-77
Credit hours: 3
Description: How do animals work in a team? In this experimental project laboratory, students will answer this question by working with a champion social insect, fire ants. Ants are unique among cooperative animals in that they can link their bodies together to build smart adaptable structures such as ladders, bridges, tents and rafts. Students will gain proficiency in the use of time-lapse photography to visualize the construction of these built structures and the use of video analysis and machine learning to track the ants. This year, we also be focusing on metabolism of ants, measured with carbon dioxide sensors. We may construct obstacle courses for the ants, but no prior engineering knowledge is required for the course.